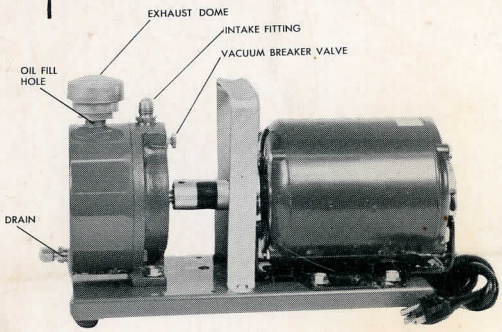
Marvac Scientific Manufacturing Co.
2931 CLOVERDALE AVE. CONCORD, CA 94518



BEFORE STARTING

Rotate shaft by hand to make sure pump is free. Remove exhaust dome and fill pump with oil to at least the mid-point of the oil level sight glass. Make sure Vacuum Breaker "O" ring valve found on pump case just above the shaft is closed tight.

Check that electrical power matches motor wiring, normally 115 V., 60 cycles, 1 phase power.

Check all plumbing for leaks. Use largest size plumbing to match pump with shortest lines possible.

OPERATION

Connect pump to system to be evacuated. Install shutoff valve in line. Start pump and you will note a gurgling sound as the air or gas passes through the pump. This should be followed by a short period of almost no sound coming from within the pump. The pump will then develop a rapping sound which only occurs when the pump is under a deep vacuum . . . normally 250 microns or less.

After system is pumped down to desired vacuum level, valve off pump and open Vacuum Breaker Valve on pump until pump makes a gurgling sound . . . now motor can be turned off. **Failure to break the vacuum within the pump at this time can result in damage to the pump on restart.**

If pump is turned off while still under vacuum, oil will be drawn into the internal pumping chamber. On restart, the hydraulic load can cause the motor to fail or cause the running fit to become out of adjustment.

NOTE: This type of Vacuum Pump is designed to operate at vacuum levels below 29.5" Hg. Damage can occur if unit operates at moderate vacuum levels for extended periods (15 minutes or more).

MEASURING VACUUM LEVELS

The type of Vacuum Gauge used depends on the type of pumping that is required. All mechanical pumps are rated at the factory with ultimate vacuums under laboratory conditions. The readings are taken with a mercury McLeod gauge in conjunction with a liquid Nitrogen trap. The McLeod Gauge measures ABSOLUTE PRESSURE. These readings are not normally achieved in the field.

In the repair and recharging of auto airconditioners a dial manometer gauge is all that is required as water vapor boils off at 29.7" Hg at Sea Level at 72°F. On most refrigeration service jobs you should be able to read vacuums to 500 microns and an electronic gauge is recommended as it is a TOTAL PRESSURE Gauge. It will indicate the presence of evolving gases. Most gauges of this type have an accuracy of plus or minus 4% and should be calibrated against a McLeod gauge when any question of accuracy arises. This is a good gauge for the refrigeration serviceman as it is essential to know if there are any contaminating gases still in the system prior to recharge. It must be remembered that the oil in the compressor vaporizes at approximately 250 microns. This means that readings in the system of less that 250 microns may be difficult, if not impossible, to achieve. Most gauges are installed at the pump intake and readings of 250 microns and less can be achieved at this point. Vacuum levels to 50 microns in refrigeration systems are impractical as it would mean the total dehydration of the compressor/refrigerator oil.

DRAIN OIL BEFORE RETURNING PUMP TO FACTORY

SERVICE HINTS

1. Change oil whenever there is a change in pump performance. The oil should be changed after pumping down a very dirty (or burned out) system. Always drain the pump while it is warm. Recharge pump with Marvac oil. **(You may also use Mobil #1 Synthetic oil available at any Mobil Gas Station . . . this is recommended during cold weather as it permits easier starts).**
2. Purging the pump. This procedure is very helpful in the field and serves to cure many ills that develop through poor maintenance.
   a. Rotate pump shaft by hand to make sure it is free so that motor can operate unit. Run the pump with Intake closed until pump is warm. Shut off pump, open Intake and drain pump oil. **With drain open** and exhaust dome removed, and the pump operating, slowly pour about 2 ounces of Marvac oil into open Intake fitting. As you hear this oil pass through the pump, cover the exhaust opening which will cause this oil and any residual oil and sludge to flow rapidly out of the drain fitting.
   Repeat until all signs of contamination disappear.
   b. When the purging is completed close drain fitting and, pouring through the exhaust dome hole, fill the pump with new clean Marvac vacuum oil to the mid-point of the oil level gauge. NOTE: It is normal for the oil level to rise as the pump warms up. If the rise is excessive, the oil is contaminated.
   c. If the shutdown means that the pump is going to be out of service for some time, drain the pump, purge and fill with new clean Marvac oil. This will help prevent corrosion by any contaminants that may be present in the old pump oil. Cover the Intake and Exhaust openings.
3. Pump will not start.
   a. Check power to motor and make sure line fuse is not burned out.
   b. Rotate pump by hand until it turns freely. Start pump and change oil — purge if necessary.
   c. If the pump is jammed and cannot be turned, do not exert excessive pressure. Unit should be returned to factory for repair.
   d. Check electric cord and switch to make sure they are operative.
4. Frozen or noisy pump. This occurs in two ways. Either the pump is oil locked which is due to the operator failing to break the vacuum in the pump before turning off the power or because the pump has been dropped or jarred.
   a. An oil locked pump must be drained and the shaft rotated to make sure it is free. It may be necessary to turn the pump over and allow the oil to drain from the intake fitting.
   b. If the pump is dropped or severely jarred it can cause the rotor to jam into the stator at the contact point (the running fit is less than .001" at this point). This can be corrected in some cases by giving a sharp rap to the rim of the front plate of the pump near the intake fitting using a lead hammer. If it doesn't break free, the pump must be returned to the factory.
   c. A severe shock to the pump can also cause the motor shaft end play to be lost in the shaft coupling. This can cause the motor fan to make noise. Loosen the set screw in the shaft coupling next to the pump and let motor end play become evident, then tighten set screw again.
   d. Check to see if pump base is bent. It must be straight so that pump-motor shaft alignment is true.
5. Poor vacuum and pumping speed.
   a. Contaminated oil — change and purge if required. Check oil level.
   b. Check all connections and joints for leaks.
   c. Piping too small and restricting capacity. Should be as short as possible and no smaller than I.D. of Intake Fitting.
   d. Remove pump from system and check separately. Check oil, check oil level and purge if contaminated.
   e. Power supply not proper. Check voltage and all lines.
   f. Pump has been dropped or jarred and running fit is no longer at proper gap (less than .001") and pump must be returned to factory for readjustment.
6. Pump runs hot.
   a. When operating at full temperature the pump and motor will run hot to touch. This is normal for both pump and motor. Pump is designed to run hot so as to assist in eliminating water from the system. It can operate without affecting ultimate vacuum ability with oil temperature up to 180°F within the reservoir tank. The motor runs hot by manufacturer design.
   b. The wrong oil can result in excessive temperatures and damage the pump. Keep oil clean and change as necessary. Use only high vacuum pump oil as supplied by Marvac or Mobil #1.

DD-84R

DRAIN OIL BEFORE RETURNING PUMP TO FACTORY